

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1-47. (Cancelled)

48. (New) A method comprising:

forming a funnel insert with a first diameter portion larger than a second diameter portion;

forming a filler tube including a funnel portion having a first diameter and a first axis and an elongated portion having a second diameter smaller than said first diameter and a second axis offset from said first axis; and

attaching said funnel portion of said filler tube to said second portion of said funnel insert.

49. (New) The method of Claim 48, further comprising configuring a transition portion of said funnel portion to induce a swirl to passing fuel for venting vapors from said fuel tank during fuel filling.

50. (New) The method of Claim 48, further comprising forming a sealing surface about an inlet opening to said funnel insert.

51. (New) The method of Claim 50, wherein said forming a sealing surface includes rolling over an edge defining the inlet opening.

52. (New) The method of Claim 48, further comprising cutting a length of tube stock to form said filler tube.

53. (New) The method of Claim 48, further comprising forming a nozzle receptor in said funnel insert.

54. (New) The method of Claim 48, further comprising joining opposite ends of a vent tube to said funnel portion and said fuel tank, respectively.

55. (New) The method of Claim 48, further comprising joining a vent tube to said funnel portion of said filler tube.

56. (New) The method of Claim 48, further comprising forming threads in said funnel insert.

57. (New) A fuel filler tube assembly comprising:
a funnel portion of a filler tube including a tubular body defining an inlet larger than an outlet, said inlet of said funnel portion having a first axis and receiving a smaller diameter portion of a funnel insert, said outlet having a second axis offset from said first axis and operable to be directly attached to a fuel tank.

58. (New) The fuel filler tube assembly of Claim 57, wherein said outlet of said filler tube is attached to a fuel tank.

59. (New) The fuel filler tube assembly of Claim 57, further comprising a vent tube connected to said filler tube.

60. (New) The fuel filler tube assembly of Claim 59, wherein said vent tube also connects said filler tube and said fuel tank.

61 (New) The fuel tube assembly of Claim 57, wherein said smaller diameter portion of said funnel insert includes a nozzle opening positioned to cooperate with an internal configuration of said tubular body between said inlet and said outlet to induce a swirl to vent vapors from fuel flowing through said tubular body.

62. (New) The fuel filler tube assembly of Claim 61, wherein said internal configuration of said tubular body includes a tapered section of said tubular body.

63. (New) The fuel filler tube assembly of Claim 62, wherein said tapered section includes an elliptically shaped junction between a first portion of said tubular body including said inlet and a second portion of said tubular body including said outlet.

64. (New) The fuel filler tube assembly of Claim 63, wherein said elliptically-shaped junction lies on a plane inclined at an angle to an axis of at least one of said inlet and said outlet.

65. (New) The fuel filler tube assembly of Claim 63, wherein said inlet has a diameter D_1 , said outlet has a diameter D_2 , and D_1 is at least one and a half times D_2 .

66. (New) The fuel filler tube assembly of Claim 57, wherein said filler tube is a seamless tube.

67. (New) The fuel filler tube assembly of Claim 57, wherein said funnel insert is a seamless tube.

68. (New) The fuel filler tube assembly of Claim 57, wherein said funnel insert includes integrally formed threads.

69. (New) The fuel filler tube assembly of Claim 57, further comprising a fuel cap selectively engaging said funnel insert.

70. (New) The fuel filler tube assembly of Claim 57, wherein said funnel insert includes a sealing surface operable to selectively engage said fuel cap.

71. (New) The fuel filler tube assembly of Claim 70, wherein said funnel insert includes a larger diameter portion having an inlet opening crating said sealing surface.

72. (New) A method comprising:

drawing a funnel insert with a first diameter portion larger than a second diameter portion;

forming a funnel portion at an end of a filler tube, an opposite end of said filler tube being operable to be directly attached to a fuel tank;

forming a relatively large inlet at one end of said funnel portion, said inlet having a first axis;

forming a relatively small outlet at said opposite end of said funnel portion, said outlet having a second axis offset from said first axis; and

joining said second diameter portion of said funnel insert and said funnel portion of said filler tube.

73. (New) The method of Claim 72, further comprising attaching said opposite end of said filler tube to a fuel tank.

74. (New) The method of Claim 72, further comprising configuring a transition of said tubular body between said inlet and outlet to induce a swirl to and vent vapors from fuel flowing through said funnel portion.

75. (New) The method of Claim 72, further comprising forming threads in said first diameter portion of said funnel insert.

76. (New) The method of Claim 72, further comprising forming a sealing surface about said first diameter portion of said funnel insert.

77. (New) The method of Claim 76, wherein said forming a sealing surface includes rolling over an edge defining an inlet opening.

78. (New) The method of Claim 72, further comprising forming a nozzle receptor in said second diameter portion of said funnel insert.

79. (New) The method of Claim 72, further comprising cutting a length of tubing stock to form said filler tube.

80. (New) The method of Claim 72, further comprising joining an end of said filler tube opposite said funnel insert to said fuel tank.

81. (New) The method of Claim 80, further comprising joining opposite ends of a vent tube to said funnel portion and said fuel tank, respectively.

82. (New) The method of Claim 72, further comprising joining a vent tube to said funnel portion of said filler tube.

83. (New) A fuel filler tube assembly comprising:
a filler tube including a tubular body defining an inlet larger than an outlet;
and
a funnel insert including a first cylindrical section received in said inlet of said filler tube, a second cylindrical section operable to receive a fuel nozzle, and a third cylindrical section disposed between said first cylindrical section and said second cylindrical section, said first cylindrical section, said second cylindrical section, and said third cylindrical section each having a different diameter.

84. (New) The fuel filler tube assembly of Claim 83, further comprising a tapered surface extending between said first cylindrical section and said third cylindrical section.

85. (New) The fuel filler tube assembly of Claim 84, wherein said tapered surface engages an outer surface of said inlet when said first cylindrical section is disposed within said inlet of said filler tube.

86. (New) The fuel filler tube assembly of Claim 83, wherein said funnel insert is a seamless tube.

87. (New) The fuel filler tube assembly of Claim 83, wherein said funnel insert includes integrally formed threads.

88. (New) The fuel filler tube assembly of Claim 83, further comprising a fuel cap selectively engaging said funnel insert.

89. (New) The fuel filler tube assembly of Claim 83, wherein said funnel insert includes a sealing surface formed about said second cylindrical section.

90. (New) The fuel filler tube assembly of Claim 89, wherein said second cylindrical section includes an inlet opening and a portion of said funnel insert defining said inlet opening creates a sealing surface.

91. (New) A fuel filler tube assembly comprising:
a filler tube including a tubular body defining an inlet larger than an outlet;
and
a funnel insert including a first section, a second section, and a tapered surface extending between said first section and said second section, said first section received by said inlet of said filler tube and including a nozzle retainer.

92. (New) The fuel filler tube assembly of Claim 91, wherein said tapered surface engages an outer surface of said inlet when said first section is disposed within said inlet of said filler tube.

93. (New) The fuel filler tube assembly of Claim 91, wherein said funnel insert is a seamless tube.

94. (New) The fuel filler tube assembly of Claim 91, wherein said funnel insert includes integrally formed threads.

95. (New) The fuel filler tube assembly of Claim 91, further comprising a fuel cap selectively engaging said funnel insert.

96. (New) The fuel filler tube assembly of Claim 91, wherein said funnel insert includes a third section formed adjacent said second section.

97. (New) The fuel filler tube assembly of Claim 96, wherein a sealing surface is formed about said third section.

98. (New) The fuel filler tube assembly of Claim 97, wherein said third section includes an inlet opening and a portion of said funnel insert defining said inlet opening creates a sealing surface.

99. (New) A method comprising:
forming a funnel insert with a first diameter portion larger than a second diameter portion and a tapered surface between said first diameter portion and said second diameter portion;

forming a nozzle retainer in said first portion of said funnel insert;

forming a filler tube with a funnel portion having a relatively large inlet at one end and a relatively small outlet at an opposite end; and

joining said first diameter portion of said funnel insert and said funnel portion of said filler tube.

100. (New) The method of Claim 99, further comprising configuring a transition of said tubular body between said inlet and outlet to induce a swirl to and vent vapors from fuel flowing through said funnel portion

101. (New) A method comprising:

drawing a funnel insert with a first cylindrical portion, a second cylindrical portion, and a third cylindrical portion, each of said first cylindrical portion, said second cylindrical portion, and said third cylindrical portion having a different diameter;

forming a filler tube with a funnel portion having a relatively large inlet at one end and a relatively small outlet at an opposite end; and

joining said first diameter portion of said funnel insert and said funnel portion of said filler tube.

102. (New) The method of Claim 101, further comprising configuring a transition of said tubular body between said inlet and outlet to induce a swirl to and vent vapors from fuel flowing through said funnel portion

103. (New) A fuel filler tube assembly comprising:

a filler tube including a first portion having a first diameter and a first axis and a second portion having a second diameter greater than said first diameter and a second axis offset from said first axis, said first portion including at least one bend; and

a funnel insert including a first cylindrical section operable to be received in said second portion of said filler tube.

104. (New) A fuel filler tube assembly comprising:

a filler tube including a first portion having a first diameter and a first axis and a second portion having a second diameter greater than said first diameter and a second axis offset from said first axis, said first portion including a first end having said first axis parallel to said second axis and a second end having said first axis extending in a different direction than said second axis.